



Fern Foundation Quarterly



Spring 2007

THE HARDY FERN FOUNDATION

P.O. Box 3797

Federal Way, WA 98063-3797

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Stephen Austin Arboretum, Nacogdoches, Texas, Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, Rotary Gardens, Janesville, WI, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover Design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

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QUARTERLY

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The Spore Exchange Needs You!

Please send your spores to our Spore Exchange Director:

Katie Burki
501 S. 54th St.
Tacoma, WA 98408

Fern Quarterly Spring 2007

President's Message

After a long wet and cloudy winter I am recovering from a slight bout of sunshine fever. The last few days the sky has been clear and spring has filled the landscape with its fresh greens and bright colors. It leads me to think of buying new additions for the garden and of one of my favorite plant sales of the season, the Hardy Fern Foundation's Fern Festival. It will start Friday June 1 with a plant sale from 1:00 to 6:30 and continue Saturday June 2 10:00 to 2:00. Friday night will feature a lecture on "Shady Companions: Ferns and Woodland Alternatives" by the very experienced plantsman Russ Graham. Russ is the owner of Russell Graham: Purveyor of Rare Plants, a well know specialty nursery near Salem, Oregon. He specializes in ferns, hellebores, epimediums, cyclamen and much more. Details on the plant sale and lecture are in this issue of the Quarterly.

A gracious thank you has been earned by all who helped with the foundation's display at the Northwest Flower and Garden Show. We received a lot of response to the booth and volunteers were inundated with fern questions. The restructuring of the educational booths by placing them along with the commercial booths really helped to increase our exposure to northwest gardeners. Also congratulations to the Delaware Valley Fern and Wildflower Society for their excellent display of the ferns of Ireland at the Philadelphia Flower and Garden Show. We received great photos of the exhibit from member Jack Schieber (see page 23). Thanks for keeping us up to date with events in Pennsylvania.

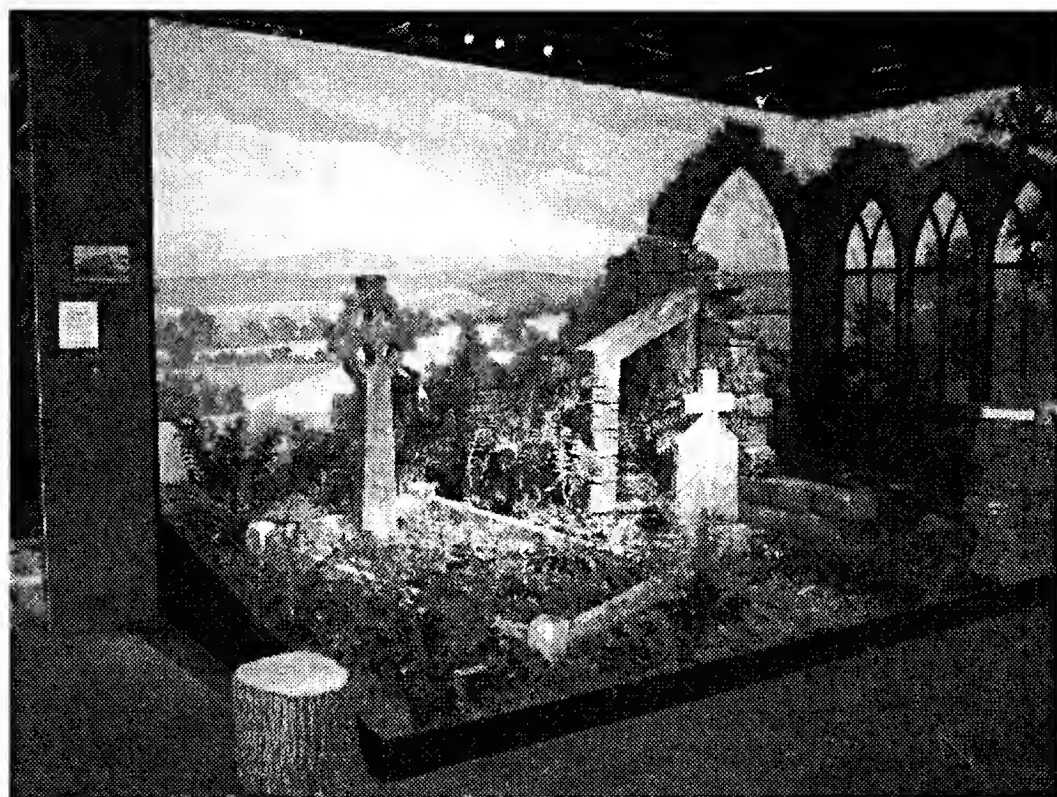
Our affiliated display garden, Whitehall Historic House and Garden, in Louisville, KY will be celebrating their first annual Fern Festival on June 23. I encourage all who can make it to attend and listen to Sue Olsen, one of our founding board members present a lecture on "Ferns for All Seasons". I wish them the best for the event. For further information contact whitehall@historichomes.org.

I also wish a hardy congratulations to Sue for the recent publication of her book "Encyclopedia of Garden Ferns". I just received my copy and cannot wait to read through it!

For all who are interested please note that there are still spaces left for this autumn's foray to Texas. Naud Burnett has set up an exciting tour that will include some beautiful scenery, gardens and of course ferns. If you are interested contact Naud at naud@naudburnett.com. To be sure of a spot do not wait too long!

The foundation was chosen to grow spore from a recent collecting trip by world renowned plant explorer Dan Hinkley. In October the Elisabeth C Miller Botanical Garden sponsored Dan's collecting trip to northern Vietnam and the Hardy Fern Foundation was asked by the garden's director Carolyn Jones to help grow spore from this trip. Watch for future reports on the progress of this spore and what comes out of this exciting venture.

*All the best,
Richie Steffen*



*Delaware Valley
Fern and
Wildflower Society
exhibit at the
Philadelphia
Flower Show....
theme Irish Ferns.*

Photo by
Jack Schieber



*HFF display
at the
Northwest
Flower and
Garden Show.*

Photo by Jo
Laskowski

Whitehall Fern Festival

FERNS FOR ALL SEASONS

a slide lecture presentation by

SUE OLSEN

on

SATURDAY JUNE 23, 2007

at 10:00 am

at

**Southern Seminary 2825 Lexington Rd
Louisville Ky 40208**

\$10 at the door no advance ticket sales

Sue Olsen, a fern expert from Bellevue, Washington, will speak on the merits of growing great ferns in your garden. Olsen is the founding president of the Hardy Fern Foundation. Her book, *Encyclopedia of Garden Ferns*, will be published this spring by Timber Press.

Immediately after Olsen's lecture, at Whitehall House and Gardens (3110 Lexington Road) there will be tours of the Hardy Fern Foundation display garden, a fern sale, and a book signing by Olsen.

Further information : Mary Anne Thornton (502) 896-4251
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THANKS TO THE SPONSORS OF FERN FESTIVAL 2007

Louisville Nursery Association
Jefferson County Master Gardeners
Pinecrest Cottage and Gardens
Whitehall House and Gardens

Book Review: *Fern Books and related items in English published before 1900* **(with additional notes on fern book collecting)**

John D. Scott

Rockland Botanical Garden

Mertztown, PA 10539

Fern Books (and related items) in English published before 1900. Nigel Hall and Martin Rickard. British Pteridological Society Special Publication No. 9. ed. B. A. Thomas. iv. 98 pp. London. 2006. pb ISBN 0-9509806-9-2. Price £15 each plus £1.50 postage & packing UK; £2.50 for rest of world. Hopefully it will be available from the BPS website by the time you read this

http://www.nhm.ac.uk/hosted_sites/bps/specialpubs/specialpubs.htm

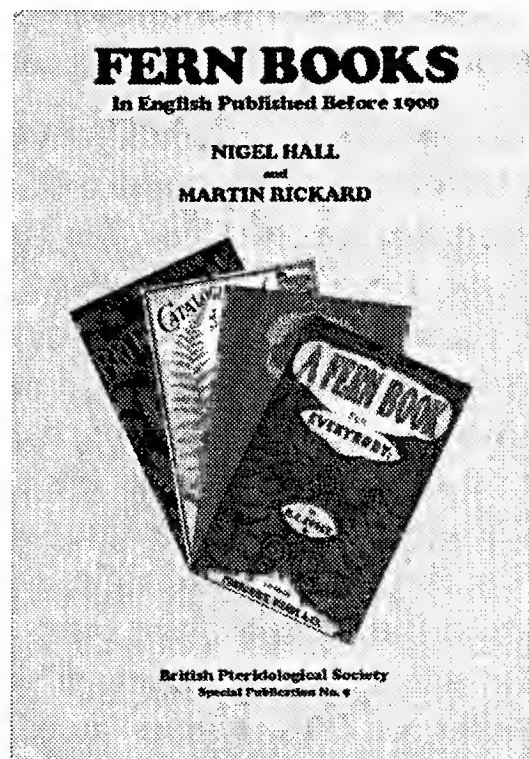
It's not often that a fern book comes along that would be of interest to other than fern enthusiasts. But this

little book has a lot to offer a broad audience – botanical biographers, book collectors, bibliophiles, and anyone who wants to see a sampling of beautiful artwork on the book covers and color plates of these early works. There is a lot of history about the early printers, engravers, and book publishing companies. There are also listings of early fern catalogs and accounts of early fern nurseries.

The title page adds “and related items” to the cover title and there is a lot more than indicated. The “related items” include nursery catalogs, albums (bound fern specimens), cards and posters. Every edition, printing and reissue that could be documented is listed – extending into the 1900s for completeness. Also useful is the listing of recent reprints of classic works by Dover Publishing, etc. There is a short biography for each author (if available), including references to further reading and citations for major journal articles and non fern books. This is followed by a listing of the fern books with an informative commentary and references to journal and magazine reviews. A fair number of anonymous authors and missing publication dates have been filled in by what was obviously a painstaking combing of the old journals and garden magazines for advertisements and reviews.

The authors have carefully researched the early fern materials, authors, and printers. Checking each entry against my own library and fern literature database (9000 entries) I found only a few minor typos, errors, omission of data and additions to the list. A subsequent article will document these. The book contains about 450 listings. Items that I could check consisted of 52 books in my library. Most of the other listings were checked for consistency against the online catalogs of the Academy of Natural Sciences Philadelphia and the New York Botanical Garden. The content is heavy on British ferns – 266, followed by North America – 47 and New Zealand – 36. The authors chose not to list regional floras

Continued on page 26



Book Review *continued from pg. 25*

and general botany books – a quite larger task that would dilute the “ferniness” (my word) of the book.

The cutoff date of 1900 is certainly reasonable for the UK with its long history of fern culture. Many of the works are illustrated with various forms of early color printing. Many national and regional guides and lots of gardening books are described.

The early authors wanted you to know the contents of their books, if not their names. The titles of many early science books were mini-abstracts. Schneider’s work is an excellent example. It is entitled “The Book of Choice Ferns for the Garden, Conservatory, and Stove, Describing and Giving Explicit Cultural Directions for the Best and Most Striking Ferns and Selaginellas in Cultivation.” Rickard explains the work was originally issued in twenty parts and later issued bound in three and seven volumes. I have also discovered what appears to be a custom half-leather set of five books probably bound from the separates. The seven book set has seven title pages which refer to the books as “divisions.” The original printed separates were apparently “divided” into seven “chunks” and bound. The first book, for example, ends with the first page of chapter ten and picks up in the second book! As Rickard points out, the seven volume work was issued anonymously with the author given as “Osmund” in the preface. No date is given in the books. Many other works had their volumes issued at different times. Often the books were issued without a date, an edition, or a printing. Sorting all this out without a reference such Hall & Rickard is nearly hopeless. Many other early works have similar idiosyncrasies such as being printed by several different printers with the same edition and date!

If you are not familiar with these old books, it is a real education in publishing practice. I think “practice” is a good term as they didn’t seem to be able to get it right. For example:

Frances Theodora Parsons’ American fern book, *How to know the ferns, a guide to the names, haunts, and habits of our common ferns* was first published in 1899. Since then this little book went through nine “editions” between 1899 and 1927 without any apparent change. I spot checked several pages in many printings and found no additions or changes. It seems to remain popular as it was reprinted twice by Dover and in 2005 by Kessinger printing on demand. The first three “editions” were bound in light brown cloth. The cover was printed in light green *Polystichum acrostichoides* fronds with the title printed in gold surrounded by a gold wreath of fronds with author, etc., printed in black. The fourth “editions” and onward are bound in dark green cloth.

The following “editions” and dates have been seen in hand or for sale.

1st 1899; 2nd 1899; 3rd 1900; 4th 1902, 1907; 5th 1909; 6th 1911; 7th 1915, 1918, 1921, 1922, 1924 (listed as ©1920); 8th 1925; 9th 1927. Dover (reprint of the 2nd edition) 1961, 1974. Kessinger print on demand 2005.

The rich early British history of pteridology is unfortunate for North American collectors as the first book exclusively dedicated to North American ferns wasn’t published until Williamson’s *Ferns of Kentucky* in 1878. This was followed in 1879 by two editions of his *Fern Etchings: sixty three etchings illustrating all the species of fern indigenous to the North Eastern States and Canada*. The first fern book covering all of North America was

Daniel Cady Eaton's *The Ferns of North America* published in 1880. Because it was apparently not a separate publication Rickard didn't list what is an equally important work Daniel C Eaton (1878) *Ferns of the Southwest, An account of the ferns which have been collected in so much of the territory of the United States of America as is west of the 105th degree of west longitude and south of the 40th degree of north latitude* <in> Wheeler Survey. Vol. VI – Botany; Its format would have lent itself to a separate issue, but I can find no evidence that it was.

Many of the early fern explorations into the west were buried in government reports. Two most notable ones were the Wilkes Expedition and the Wheeler Survey. Brackenridge.

W. D. Brackenridge (1854) *Botany. Cryptogamia. Filices* <in> *U.S. Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes* vol. 16 and atlas (1855). Rickard mentions that only 100 copies were printed but “here is the rest or the story.” It is rare to find information on the number of books printed. In searching Google for information the following emerged. There are several books on the history of the expedition and the publication of the reports of the Exploring Expedition. Apparently Brackenridge had difficulty completing the work of ferns and turned to Asa Gray for help. Then he had difficulty getting his report published (didn't have the GPO). The printer required a minimum of 250 copies. Of the first 100 copies, Brackenridge sent 25 to the government, kept 25 for presentation copies and sold the rest. The second 150 copies he put up for sale. He then decided to copyright the work “to preserve the integrity of the work” and 1000 copies were printed. Before they were distributed a warehouse fire “burnt them all up.” The Library of Congress has 4 copies of the report in its vaults and the Smithsonian Botany Library also has four, one with the atlas!

Hall & Rickard list Clute's *The Pteridophyta of North America, north of Mexico* 1895. Binghamton: F. White 23 pp. (NS= not seen). This was actually published as *Linnaean Fern Bulletin* #9 (Vol. 3 no. 1). It is a numbered list of the pteridophytes. Clute is listed as the publisher at Binghamton. I can find no reference to White or a reprinting. Following is the note in *Linnaean Fern Bulletin* #10 (Vol. 3 no. 2): 10-11: “Cost of the Fern List.—As the fern-list is not entirely a (Linnaean) Chapter account a statement of its cost is given herewith. The entire cost, including binding and mailing is \$15.65. Of this sum the subscribers paid \$9.71 and the Chapter \$5.94. One thousand copies were issued and it was intended to send each subscriber forty-five; but the cost of mailing made it necessary to limit the number to twenty-five. Any subscriber who wants the other twenty copies can have them upon receipt of five cents for mailing. Those subscribers who sent more than the fifty cents required will receive their copies without extra charge.”

One omitted early work worth mentioning is Thomas Meean's *The native flowers and ferns of the United States* (1878). Series I in 2 volumes L. Prang and Co. Boston. (1878) Series II in 2 volumes American Nat. History Pub. Co. Philadelphia. This set has special meaning to me as it was given to me by my mentor Dr. Edgar T. Wherry. Each of the four volumes has 48 color plates. The fern plates number thirty (2, 5, 12, 11 for each of the four volumes) taking on more importance in the second series. While it has more flowers than ferns, there are beautiful color plates of ferns. These are among the most alive-looking fern drawings that I have. It is one of the few early works to represent the entire North

Continued on page 28

Book Review *continued from pg. 27*

American continent.

For the book collector and bibliographer Hall & Rickard is an invaluable book which in spite of being well researched will probably never be complete. Rickard (private communications) wished he had put more photos in the book to aid in sorting out the confusion in some of the multiple printings. As mentioned earlier, these old book covers and color plates are true works of art worth seeing in a comprehensive work such as this.



Book Review

Sue Hollis

Kansas City, MO

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The Ferns and Fern Allies of Pennsylvania, by Thomas R. Lord and Holly J. Travis. 2006. Pinelands Press, Pemberton, New Jersey 08068. 233 pp. Soft cover (ISBN 0-96400267-9-1) \$45.00. May be purchased by sending \$45.00 to Dr Thomas Lord, Department of Biology, Weyandt Hall, Indiana University of Pennsylvania, Indiana PA 15705.

This book starts with an introduction which establishes that it is "a general text on the state's Pteridophytes" and not a field guide, for the use of both amateurs and more accomplished botanists. For that reason, photographs are used instead of line drawings. This is followed by an overview of pteridophyte reproduction in text only.

There are indented keys to the orders at the front and to the family, genera and species at the beginning of those sections. The keys use very technical, even obscure, language for the most part. For example, an important characteristic in the keys to the Ophioglossaceae is the angle of veneration of the sterile branch. Some of the keys give rather general information, with nothing to help compare between similar plants. Even a very accomplished amateur would have a hard time using these keys.

The book has no morphologic guide or glossary, leaving the user pretty much in the dark about the meaning of terms used to describe various parts of a plant. Nomenclature is a problem in that "x" is not used to show hybrids.

There are indices to common names and scientific names. Current taxonomic names are used throughout for the most part. However, no synonymy of scientific names is given anywhere. This makes it hard to cross reference with other books. It also poses a problem when one key leads to *Camptosorus* and that term is shown nowhere else.

Each species is given two pages. One page gives a photograph of the form and often a little habitat, such as a cliff. These photos do provide good information on the growth form and are generally very attractive. A second photograph on the same page gives a close-up photo, often showing spores or a clearer shot of one frond. The frond pictures are very good and clearly show many diagnostic characteristics. The spore pictures are more often not at all clear and of little use in describing the subject.

The second page gives the common and scientific names, other common names, characteristics, habitat, range, remarks, a Pennsylvania dot map and US range map. Some descriptions are given in amateur friendly terminology and some are very informative. Most are much more understandable than the keys and some are excellent. The only real problem is that not all characteristics are described for each or even similar species so comparison is difficult.

Some remarks sections give some brief descriptive information. Most of the space is given to the meaning and history of the scientific name. That is interesting but not meaningful when the rest of the book does not help identify the fern in the first place.

The range maps and range descriptions often vary immensely from each other and are often wildly inaccurate, excluding or including large areas where the fern does or does not exist. Either or both could have been left out with no loss to the book. I assume the state dot maps are more accurate but do not have personal knowledge to confirm that.

The saddest part is that very significant parts of each page are blank or filled with information that is not particularly useful. The book could have been vastly improved by using this space to completely describe each plant.

The overall book is attractive in appearance. However, numerous spelling, grammar and punctuation errors, often several per page, made it very annoying to read. A number of these errors actually made the meaning of a passage quite unclear. Several scientific names were misspelled, including a key that lead to *Melteucca*.

A book on Pennsylvania pteridophytes has been needed for a long time and I was delighted to learn about it. After a careful review, I suggest that the second edition of the Peterson Field Guides *Ferns of Northeastern and Central North America* is a far superior guide for the same area with the exception of state dot maps. It does have a glossary, morphology section and synonymy.

Polystichum vestitum

Prickly Shield Fern

James Horrocks, Salt Lake City, Utah

The species name means “covered or clothed”, no doubt referring to the dense scaly nature of the stipe and rachis. *P. vestitum* is an Antarctic alpine fern frequenting the colder, wetter areas of New Zealand, Tasmania, and Australia. In New Zealand it is more abundant southward and in the North Island, it is found mostly in mountain scrublands. Here it often festoons disturbed areas and cleared hillsides almost to the exclusion of other plants. *P. vestitum* shows a strong preference for colder climes and is not tolerant of hot ones. It is not particularly fussy about soil types, accepting of a variety of conditions. It is closely related to *P. proliferum*, another native of the region, but differs in the more prickly feel of the fronds and by the absence of bulbils. *P. cystostegia*, also native to New Zealand, has been compared as “in effect a dwarf version of *P. vestitum*” although the fronds are somewhat dimorphic and of a softer texture. *P. vestitum* appears to be “a single, albeit morphologically variable, taxonomic species, with no subspecies.”*

Description: *P. vestitum* is a medium-sized strong growing fern with an erect stout rhizome, often forming a short trunk and branching underground to form dense colonies when growing in the open. The older portions are thickly beset with old frond bases which can be nearly black in color. The younger growing portions are densely clothed in reddish-brown scales. The harsh prickly fronds arising from the large pronounced crowns can be up to three feet or more in length and are leathery and bristly, although considered semi-deciduous. The fronds are dark green and glossy above and a paler green and less glossy below. The stipe and rachis are both clothed with large stiff brown to blackish-brown shiny scales with paler margins. The stipe is up to 1/3 the length of the frond. In outline the fronds are considered narrowly oblong or elliptic to narrowly sub-lanceolate, bipinnate, with oblong acute pinnae. The pinnules are ovate and somewhat auriculate, having a basal acroscopic lobe ending in a sharp point, giving the fronds a bristly prickly feel. There are four to eight round sori on each fertile pinnule. The sori are covered with small thin, membranous indusia having black centers and are arranged closer to the midrib of the pinnule than the margin.

Culture: This beautiful species is said to be easy to grow in milder wetter climates. It will not survive in hot places, particularly if the humidity is relatively low. The author has attempted it twice here in northern Utah but it failed both times. It is considered hardy from Zone 6 through Zone 8 but will most likely not tolerate extreme cold. There seem to be conflicting reports as to its true cold tolerance, some placing it more comfortably in Zone 7. Being a rarely available fern, it has probably not been tried in areas that could be suitable. It seems to tolerate a wide variety of soil types and can grow in partially sunny areas if enough moisture is available. Generally, it is probably better in open shade. As with all ferns, mulching is beneficial, but *P. vestitum* seems to resent being pampered. Once established, it should be given room because of its spreading nature, and of course, adequate moisture should be provided. If you live in a climate that would suit it, the Prickly Shield Fern could give that “extra texture” to the fern garden.

References:

Ferns, Roger Grounds, 1974, Pelham Books LTD, London

Ferns and Fern Allies of New Zealand, Eric Heath and R.J. Chinnock, 1974, A.H. and A.W. Reed LTD, London

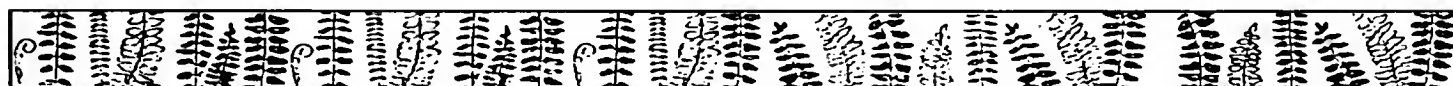
Fern Grower's Manual (Revised) Barbara Joe Hoshizaki and Robbin C. Moran, 2001, Timber Press, Portland

Encyclopaedia of Ferns, David L Jones, 1987, Timber Press, Portland

A Guide to Hardy Ferns, Richard Rush, 1984, British Pteridological Society, London

Ferns For American Gardens, John T. Mickel, 1994, Macmillan Publishing Co., New York

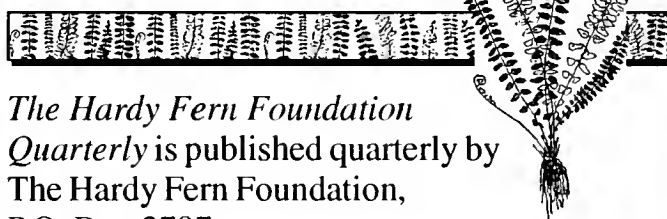
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New Members

Marian Fry
Patrick Green
Victoria Gunderson
Richard and Deanna Iltis
Fred Kahm
Steven Kelley
Eugene McKenzie
J. Rosemary Read

THE HARDY FERN FOUNDATION QUARTERLY



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Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

Please send your submissions to:

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HOLLY FERNS - THE GENUS *CYRTOMIUM*

Joyce Descloux, Randolph, NJ and Ocala, Florida

I obtained my first holly fern, *Cyrtomium falcatum* 'Eco Korean Jade', ten years ago, hoping it would survive as an outdoor plant in my northern New Jersey garden. It did and is with me still. Enchanted with the elegance of this miniature fern, as well as its hardiness, I have acquired as many different cyrtomiums as I could. I have found each one sturdy, beautiful and unique, and quite different in appearance from most ferns. In fact, most people do not recognize them as ferns at all, for with their wide, curved, lustrous and leathery pinnae they could be mistaken for any number of other plants.

*Cyrtomium
falcatum*
'Maritimum'



My garden is on a rocky wooded hillside, dominated by native oaks and hickories, carpeted in parts by the native Christmas fern, *Polystichum acrostichoides*, a cousin, I found, of the cyrtomiums. They seem to like the same conditions - humusy soil among rocks, good drainage, open, airy sites in dappled sun-shade, and, especially, to be left alone once established. (I have lost older plants I moved.)

The outstanding features of "Cyrts," as I like to call them, are their beautiful wide curved pinnae, and graceful stance. They grow in a symmetrical arrangement, the fronds nicely arched, as a bouquet. I also am grateful for their durability. In spite of an often dainty appearance, these ferns are tough. I know of no others that stand up as well to wind. And they are seldom, if ever, bothered by chewing pests, so the fronds keep pristine throughout the growing season.

The genus *Cyrtomium* is interesting, in that it is a recent development of the fern family tree - right at the tip - as shown in a diagram in Mickel's *Ferns for American Gardens*. It is very closely allied with the genus *Polystichum*.

The genus is native to eastern Asia. Most species are found in China, Korea and Japan. *Cyrtomium falcatum* has spread widely throughout southeast Asia, India, and parts of southern Africa. It probably reached Europe in the 17th century, spores or plants carried by the spice trade. It became naturalized on the southeastern plain of the United States by the early nineteenth century. It was and is still used in Christmas decorations in place of holly, which it resembles, and is known commonly here and in England as "holly" fern.

Exactly how many *Cyrtomium* species there are is yet unknown. I have found a total of 63 names, but most of these have not yet been accepted as valid species, and may never be. Horticultural manuals may give a number of ten to fifteen, but never name them all, so it's not possible for the average gardener to find out what names have been accepted. Only five or six are in horticultural commerce, as far as I can determine.

Cyrtomium falcatum was originally published as *Aspidium falcatum* by Carl Linneus (the son). *Aspidium* means "A little shield" in Greek. That epithet was Latinized and applied to all ferns that held the indusium in a peltate manner on a little stalk - like tiny mushrooms, so as to shield the spores, (whence the term "shield" ferns). He chose the specific epithet to describe the pinnae as shaped like a falcon's claw.

Carl Linneus, (the father), was a physician and professor of medicine at the University of Uppsala in Sweden. He sent many of his students all over the world looking for plants, especially those used medicinally by indigenous peoples. The oleoresin of some *Aspidium* ferns was useful as a purge for intestinal parasites.

In his *Species Planetarium* of 1753 Linneus set forth his new binomial system for the naming of plants according to the similarities of their reproductive parts. In ferns these were the sporangia and indusium. However, botanists seeking to organize and name the many new ferns being brought from Asia, North America and elsewhere, were soon finding that many disparate types were being lumped together as *Aspidium*.

Thus, by 1800 or so, the latter name gave way to the closer generic groups we know today as *Dryopteris*, *Polystichum*, *Arachniodes*, and others. *Aspidium falcatum* became *Polystichum falcatum* Swartz.

In 1836 Karel Presl, an Austrian botanist, put this fern and another that had been found into a new genus, *Cyrtomium*, noting differences in their structure that set them apart from *Polystichum* species. The veins arched into a network (thus, the genus name which means arching), and the indusia were scattered all over the pinnae, not held in rows. He published *Cyrtomium falcatum* (L.f.) Swartz, and also *Cyrtomium caryotideum*. He chose the specific epithet of the latter for the resemblance of its three pronged terminal pinna to the leaves of *Caryotis*, a genus of nut palms.

Thirty years later, in 1866, another fern, which had been previously described as *Aspidium falcatum* var. *fortunei*, was elevated to species status as *Cyrtomium fortunei* by J. Small in England. While similar to *Cyrtomium falcatum* in size and growth habit, the fronds are held more erect; the pinnae are not as shiny, and are narrower, with sharp points at the apex. Also, it had proved to be a much hardier species.

In 1902 *Cyrtomium fraxinellum* and *Cyrtomium lonchitoides* were published by H. Christ, a Dane. He also published *Cyrtomium vittatum* in 1905, *Cyrtomium balansae* in 1913, and *Cyrtomium nephrolepiodes* in 1928. Only *C. lonchitoides* is in commerce, as far as I know. The name means "lance-like" and refers to the lankiness of this lean small plant.

In 1999 Tony Avent of Plant Delights Nursery found a *Cyrtomium* fern growing wild on Ullong Island in Korea. It was identified, propagated from spores, and sold as *Cyrtomium balansae*. I obtained plants in 2003 and found it to be an excellent garden fern, beautiful and easy to grow, with light green coloring. I was disappointed to learn later that he had decided it was not *C. balansae*, but a form of *C. fortunei*. It is not the same as any other form of *C. fortunei* I grow, so I still call it "balansae" to distinguish it.



*Cyrtomium
lonchitoides*

Cyrtomium macrophyllum, large leaved holly fern, was published in 1934 by Tagawa in Japan. This species is now in general circulation and makes an unusual specimen with its huge pinnae, large terminal crest and yellow-green coloring. Tagawa published two more names in 1938: *Cyrtomium taiwanianum* and *Cyrtomium takusicola*. The latter may be

the same as *C. tukusicola*, now considered a variety of *Cyrtomium macrophyllum*.

In 1936 a Chinese Botanist, Ching, published *Cyrtomium urophyllum*. In 1965, Ching & Shing published 38 more *Cyrtomium* species, and another in 1977. Japanese authors published two more species in 1985 and 1992. None is in commerce yet.

It is discouraging to an avid gardener, like myself, that after all this time, only five valid species of *Cyrtomium* are in general cultivation. However, several new *Cyrtomium fortunei* types from recent explorations in China by Hans Hansen of Terra Nova Nurs-



*Cyrtomium
macrophyllum*

Continued on page 34

Holly Ferns *continued from pg. 33*



Cyrtomium fortunei
'China Ruffles'

eries have become available. I have three. My favorite is 'China Ruffles', a dainty diminutive fern with fancy leaflets. I also have a vigorous tall plant of *C. fortunei* grown from spores from one that Avent found naturalized in northern Louisiana. With the 'balansae' and *Cyrtomium fortunei* var. *intermedium*, a smaller type, this makes a total of six different forms of this one species. They range in height from 12 to 36 inches; from medium-small ferns to very large. The pinnae all vary somewhat too from plant to plant. Each one is distinct.

There are also several varieties of *Cyrtomium falcatum* available to the gardener. The miniatures I grow are 'Eco Korean Jade' and 'Maritimum', similar but not identical. They may be grown as pot plants indoors, yet they are hardy in the garden to near zero degrees F. But they must be properly sited, cared for and protected in winter. (Mine get only a natural covering of oak leaves). 'Butterfieldii' and 'Rochfordianum' are two clones developed by nurseries. Both are outstanding, the former for its deeply serrated pinnae, the latter for its very shiny foliage.

In addition to the species and their forms, another interesting *Cyrtomium* for the gardener is the hybrid between *Cyrtomium falcatum* and *Cyrtomium caryotideum*. This cross was developed in order to instill the sheen of 'falcatum' into the latter, and the hardiness of 'caryotideum' into the former. I do find this plant a bit stiff and coarse when compared to the other cyrtomiums I grow, lacking the beauty and grace of the natural forms.



Cyrtomium
fortunei
var.
intermedium

Thus, there are 15 or possibly more different cyrtomiums available to the gardener today. Hopefully, others will come along in the future, thanks to explorations of modern plant hunters, as well as our dedicated nurseries. To them we gardeners owe a huge debt of gratitude, and definitely our patronage.

In closing, I ask readers who can add information about the cyrtomiums they grow or know to please contact myself or the editor, for this is an ongoing study.

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Addenda – *Cyrtomium falcatum* has been selected for 2007 by The Florida Nurserymen, Landscapers and Growers Association as one of the top five plants recommended for the state of Florida.

Holly Ferns

In early June, two additional Holly Ferns were added to the Birmingham Botanical Garden Synoptic Garden. If you visit the Glade, you may want to compare color, leaf form and growth habit of our 10 attractive ferns of the genus *Cyrtomium* (Table). Members of this genus are collectively called Holly Ferns in obvious reference to the resemblance of their stiff, glossy evergreen fronds to the durable leaves of hollies (*Ilex* spp.). In the Glade their onc-pinnate fronds offer a nice visual change-of-pace from the lacy leaves of their pteridophyte neighbors.

Table. Ferns of the genus *Cyrtomium* displayed in the BB Gardens' Fern Glade as of August 2006.

Common Name	Scientific Name	Derivation of Name	Characteristics and Comments
Holly Fern	<i>Cyrtomium</i>	<i>Kyrtoma</i> (Greek) which means arch. The arch referred to is that of the arching veins that form enclosed areas (areolae or netted veins) in the pinnae of species in this genus.	Netted veins; round sori covered by umbrella-shaped indusia; lateral pinnae about equal in size; terminal pinna similar to lateral ones; sometimes an upward ear at the base of the pinnae.
Fishtail Holly Fern or Dwarf Holly Fern or Netvein Holly Fern	<i>C. caryotideum</i>	"Like Caryota" which refers to the genus <i>Caryota</i> or Fishtail Palms. The three-pronged silhouette or "fishtail" appearance of the terminal pinnae of this fern mimics the leaflet in the Fishtail Palm. The genus name <i>Caryota</i> is based on <i>karyon</i> (Greek) meaning nut and presumably refers to the palm's round, nut-like half-inch brown fruit.	Fewer, but larger pinnae than the more common <i>C. falcatum</i> . Light, pale-green pinnae are not glossy. Terminal pinnae have two or three sharp lobes (creating "fishtail" appearance) and a prominent ear extends from the base.
House Holly Fern	<i>C. falcatum</i>	Sickle-shaped or curved like a sickle (Latin)	Beautiful, glossy fronds with up to 10 pairs of pinnae, often eared. Tolerant of low humidity and is often grown as a houseplant.
Mini Japanese Holly Fern	<i>C. falcatum</i> 'Eco Korean Jade'	Eco is a name included in the cultivar names of various plant species introduced by Don Jacobs, founder of Eco-Gardens, Decatur, GA. Spores of this deep green (jade) miniature were collected in Korea (personal communication).	A terrific dwarf form with glossy, deep-green, sickle-shaped pinnae on short (~8") fronds. One of the best performers in our home garden for 10+ years. Currently being propagated by Casa Flora in Texas.
Rochford's Holly Fern	<i>C. falcatum</i> 'Rochfordianum'	Possibly an introduction of century-old Joseph Rochford Gardens, Hertfordshire, England, but unable to confirm this origin.	Margins of the pinnae are more coarsely fringed than <i>C. falcatum</i> . Most common holly fern available commercially.
Hybrid Holly Fern	<i>C. caryotideum</i> x <i>C. falcatum</i>	This hybrid of two species within same genus may be designated by alphabetically listing both species names separated by the multiplication sign (x).	Sue Olsen notes in her 1999 catalog (Foliage Gardens) spores came from British Pteridological Soc. exchange. Pinnae are shaped much like those of <i>C. caryotideum</i> but glossier, i.e., more like <i>C. falcatum</i> .
Hardy Japanese Holly Fern	<i>C. fortunei</i> var. <i>fortunei</i>	Named for Robert Fortune, a 19 th century Scottish horticulturist and plant collector in China.	Compared to <i>C. falcatum</i> , gray-green fronds are much duller, less leathery and usually possess more pinnae. Hardy to Zone 5.
Hardy Japanese Holly Fern	<i>C. fortunei</i> var. <i>intermedium</i>	" <i>intermedium</i> " means intermediate space, referring to the fewer (about 10 – 12) and more separated pinnae this variety possesses compared to the 15– 26 pinnae pairs typical of the species.	The fewer, larger pinnae are more rounded at their base and the fronds tend to spread or arch more horizontally than those of the species. (New 2006)
	<i>C. lonchitoides</i>	"like a lonch" and <i>lonch</i> (Latin) means lance or spearhead	Resembles <i>C. fortunei</i> but broader, lance-shaped, widely separated pinnae. (New 2006)
Large-leaved Holly Fern	<i>C. macrophyllum</i>	<i>macro</i> = large and <i>-phyllum</i> (Latin) means leaf	Few (2– 8) pairs of pale (yellow) green pinnae have smooth margins. Large lower pinnae can measure 3 x 7 inches.

This table lists some of the commercially available holly ferns, but depending on who is doing the "splitting or lumping," up to ~60 *Cyrtomiums* have been listed. About 15 species are generally accepted.

House Holly Ferns (*C. falcatum*) make superb indoor plants, with specimens known to develop 3 – 4" trunks in 15 – 20 years. Holly Ferns are also worthy garden specimens. Visit the Glade and compare a few.

– submitted by Dan Jones, Birmingham, Alabama

FERNS OF NEW ZEALAND PART 1

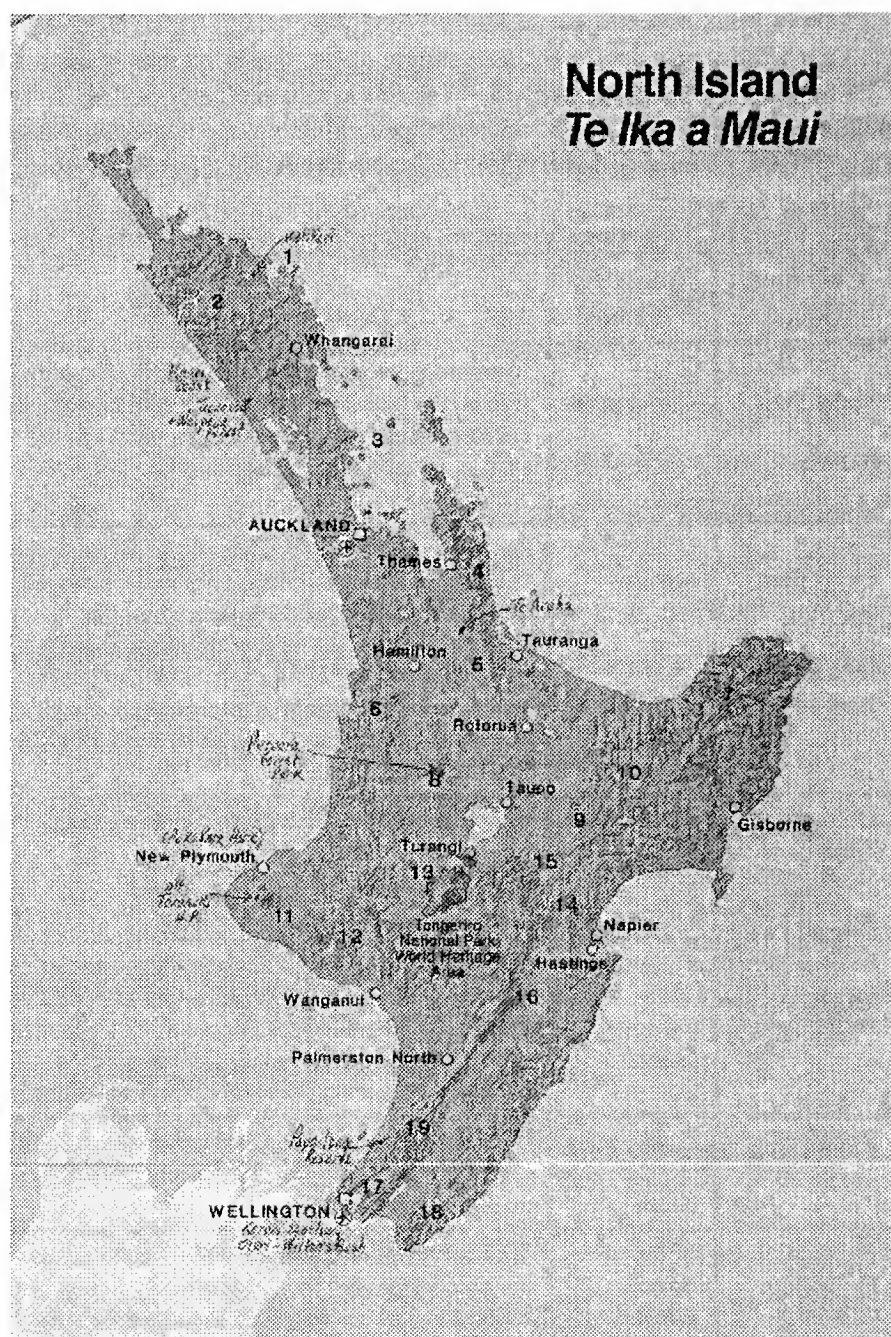
Joan Eiger Gottlieb

Pittsburgh, PA

You have to love a country whose national symbol is the silver fern. Ferns and New Zealand have been together for a very long time. In fact, the two remaining genera – *Psilotum* and *Tmesipteris* – of one of earth's oldest vascular land plant families (Psilotaceae) still grow there. Most other primitive fern families are found in NZ as well, including Ophioglossaceae, Marattiaceae, Lygodiaceae and Gleicheniaceae. And, literally “topping” them all are several genera of tree ferns, a few reaching heights of 60’ (18m) with fronds as long as 15’ (4.6m). Many of these groups can be traced back to the Permian era (225+ million years ago), when New Zealand’s North, South and

Stewart Island land masses were connected to others, forming the super-continent Gondwana. When the continental plates began drifting apart 80 million years ago, New Zealand became separate and continued to shape itself through tectonic plate collisions, mountain uplifts, volcanic activity, a series of Pleistocene Ice Ages, and biotic migration across the Tasman and South Pacific waters.

The most recent challenge to the flora began about 1,200 years ago with the Maori (Polynesian) settlement, followed by Europeans 200 years ago, after the pioneering explorations of Abel Tasman, James Cook and others. Burning and clearing, urban development, and foreign species introductions resulted in the restriction of New Zealand’s native plants and animals to a fragmented system of national parks and forest reserves, protecting about 10% of New Zealand’s land mass. Almost half the native birds have become extinct since humans discovered NZ, the large, flightless moas being the most dramatic examples. Even the country’s signature kiwis, are now rare and local. The tuatara, a distinctive, 2’ (0.6m) long, crested reptile, is found today only on a few offshore islands and a protected, mainland reserve. Except for a couple of bat species, there were no extant mammals in NZ until people brought everything from rats and cats to the omnipresent



sheep. Other than humans, the mammal most destructive to New Zealand's native plants is the Australian brush-tail possum. Originally imported for the fur trade, it climbs and has an insatiable appetite for nearly everything green.³

Today, NZ has 4+ million residents, 75% of whom live on the North Island. Clean energy is supplied from geothermal and hydropower, a lot of the latter imported from the South Island over cable laid in the Cook Straits. Since the country is notably "down under," its seasons are the reverse of ours, and the North Island is the one closer to the equator while the South and Stewart Islands face Antarctica. Having set the stage, it is time to retrace the path taken by the group of 14 who signed up for "Ferns of New Zealand," a University of California (Berkeley)/Jepson Herbarium workshop from December 1-12, 2006, expertly led by fern specialist Dr. Alan R. Smith. Of the 209+ species listed in *New Zealand Ferns and Allied Plants*¹ we saw nearly half on the North Island. Following is a daily log of our "fern" adventure.

DECEMBER 1-2 – Out of Auckland

With a population of 1.3 million, **Auckland** is, by far, New Zealand's largest urban area. It sprawls outward from a narrow isthmus between the Hauraki Gulf and the Tasman Sea and claims picturesque harbors and offshore, volcanic islands on both sides. A short tour of the city culminated on **Mt. Eden**, an old volcanic crater 747' (228m) high, with striking, panoramic views. The bowl-shaped, crater summit was terraced and fortified by local Maoris to prevent tribal invasions. It is kept groomed today by free roaming bands of cattle. From there it was on to the **Auckland Domain**, a huge city park that is home to the War Memorial Museum, a rich storehouse of natural history exhibits (moa skeletons, Gondwana flora) and cultural artifacts (Maori decorative carvings, war implements).

The **Fernz Fernery**, a bit downhill from the Museum, has a nice collection of NZ ferns under glass and lath, providing a labeled introduction to the common species we saw later in their natural settings. After lunch there was a long drive to the **Waipoua Kauri Forest** area on Northland's west coast. Before bedding down at the Holiday Park north of Dargaville, there was a guided night walk in nearby **Trounson Kauri Park**. Standing still and silent in several places, we were rewarded by the appearance of two brown kiwis quite close to the trail. In red light illumination provided by our patient guide, many magical minutes were spent watching as the female foraged for worms, insects, and seeds, while the more reclusive male patrolled and called (a surprisingly loud, honk-like sound) nearby. The surreal scene was enhanced by persistent calls of the native "morepork" owl, by large, carnivorous, kauri land snails, and by spidery-legged, cave wetas (wingless, grasshopper-type insects).

DECEMBER 3 – Waipoua Forest, kauri walks

Our conservation-minded hosts at Trounson had a variety of native ferns around all the guest accommodations and campgrounds. On the morning of our departure, Dr. Smith used this serendipitous, outdoor "classroom" to introduce the group to New Zealand's fern

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Ferns of New Zealand Part I *continued from pg. 37*

riches. A complete plant list for each location visited during the workshop is available from the writer. We peered through hand lenses at distinctive teeth on scale margins of the tree fern *Sphaeropteris (Cyathea) medullaris* (Cyatheaceae), called “black ponga” for the very dark stipes of its colossal fronds. We eyed the stunning *Marattia salicina*, whose 10’(3m) long, glossy fronds bear fused sporangia at pinnule edges. We pondered the spaced vs. overlapping pinnae of *Pteris macilenta* (an endemic (E) species) and *P. tremula* (Pteridaceae), respectively. The creeping lycopod *Selaginella kraussiana* and the wiry *Nephrolepis cordifolia* (Lomariopsidaceae) were noted as introduced, naturalized species. *Pyrrosia eleagnifolia* (E) produces sturdy, tough, simple fronds and polypody-round sori as its rhizomes creep over old logs or up the trunks of trees. Nectaries at the pinna bases of Australasian bracken, *Pteridium esculentum* (Dennstaedtiaceae) appear to attract protective ants. Another dennstaedtioid, *Paesia scaberula* (E), has finely dissected, stiff fronds, a zig-zag rachis, and a tendency to be a bit weedy in open spaces, like its bracken cousin. Several members of the Blechnaceae were spotted, including stiff-leafed *Doodia media* (popular in pot or garden culture), *Blechnum filiforme*, a ubiquitous, endemic climber, *B. discolor* (E), a vase-shaped, colony former, and *B. fraseri*, with upright rhizomes (resembling thin trees with foot-high trunks) and a radial crown of broad, bipinnate fronds. The signature *Blechnum* of NZ, without contest, is *B. novae-zelandiae* (E). Its unfurling crosiers are a glowing pink and its long, simple pinnae taper down to mere nubbins at the base, a trait that is even more dramatic on the skeletonized, fertile fronds. Other ferns at Trounson included **endemics** like the large spleenwort *Asplenium oblongifolium*, two tree species - *Dicksonia squarrosa* (Dicksoniaceae) plus *Alsophila (Cyathea) dealbata* (Cyatheaceae), and the filmy ferns *Cardiomanes (Trichomanes) reniforme* and *Hymenophyllum demissum*.

Dicksonia tree fern trunks are often lashed together side by side to make decorative property fences. New plants sprout from buds at the old leaf bases or near the tops – a showstopper. Cross-sectional cuts confirm that tree ferns are not “woody” in the classical sense of cambium-generated, secondary xylem. Rather, the bulk of their 6”(15cm) diameter is composed of fibrous leaf bases and adventitious roots. Primary vascular “bundles” and pith occupy only the central 2”(5cm).

The afternoon was spent on trails in Northland’s **Waipoua Kauri Forest**. Waipoua (a Maori word) means “dark, gloomy water,” but these spectacular woods give light and life to ancient conifers like the massive **kauri trees** (*Agathis australis* – Araucariaceae) along the “Four Sisters” trail. Europeans valued the solid grained, easily worked, decay-resistant wood and used its resin or “gum” in varnish and polish. Before long, the native “gumland” forests on the northern 2/3 of the North Island were gone, except for a few conserved patches north of Auckland and on the Coromandel Peninsula.

Along with its kauris, the cathedral-like canopy of Waipoua belongs to the broadleaf conifer family Podocarpaceae and includes rimu – *Dacrydium cupressinum*, a majestic tree with weeping branches, scale-like adult leaves, and a peeling bark that leaves water ripple patterns. Other podocarps are present, as are various vines called climbing ratas (Myrtaceae). The family Myrtaceae also contributes two common shrubs to forest openings and edges, e.g., small-flowered kanuka, *Kunzea (Leptospermum) ericoides* and its



Tmesipteris tannensis. Photo by Milton Gottlieb.

lanceolata. The latter has tapered, undivided fronds that look like pieces of broad shoe lace hanging limply from rocks or tree trunks. Members of the Grammitidaceae are found only in undisturbed forests and have large, oval, or slightly elongated sori. Filmy ferns are well represented in Waipoua by *Cardiomanes reniforme* (2"-wide, kidney-shaped, translucent fronds, edged with sunken sori and thin rhizomes that romp over old tree stumps – enchanting!), *Hymenophyllum rarum* (smooth, with finger-like pinnae), *H. dilatatum* (largest of the NZ filmies), and seersucker-surfaced *H. sanguinolentum* (E) – a resurrection species following droughts.

Impressive stands of tree-like *Blechnum fraseri* were seen and large plants of *Asplenium bulbiferum* along the Waipoua trails were abundantly endowed with plantlets. Occasional specimens of the gully tree fern, *Alsophila (Cyathea) cunninghamii* and the lycopods *Huperzia varia* and *Lycopodium deuterodensum* were spotted. But, the major find of the day, to the writer's admittedly biased eyes, was the fork fern *Tmesipteris elongata*, dangling from old leaf bases of *Dicksonia* species. It has half-inch long, simple, dull-green, spine-tipped, flexible foliage and pairs of rounded, axillary sporangia, all characteristic of this species – a thrill to see in its native forest.

The reader may have noticed how often the term "endemic" is used to describe New Zealand's ferns. It means "native to a particular place." Of approximately 200 fern species (including lycopods, horsetails, and quillworts) in the country, roughly 40% are

look-alike, but prickly-leaved cousin, manuka (*Leptospermum scoparium*). An interesting, southern family Coriariaceae is represented here by tutu (*Coriaria arborea*), a straggly shrub with opposite leaves and pendulous clusters of purple fruits. Shiny-leaved *Micropiper excelsum* (Piperaceae) and fan-shaped *Collospermum hastatum* (Liliaceae) are also notable flowering plants in this forest, the latter as a common, massive epiphyte on large tree branches.

Greeting us near the trailhead were tangle fern, *Gleichenia microphylla*, with a beautiful symmetry generated by wide-angled, dichotomously branched rachises, the epiphytic grammitid ferns *Ctenopteris heterophylla* and *Grammitis pseudociliata*, and the endemic
GENUS *Anarthropteris*

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Ferns of New Zealand Part I *continued from pg. 39*

endemics, and there are three endemic GENERA -*Anarthropteris*, *Leptolepia*, and *Loxoma*. This is a reflection of long isolation following the breakup of Gondwana - time for extinctions due to catastrophic sea level changes, volcanic activity, and periodic climate cooling; time for dispersal of species (about 13% of NZ's plant species are also found in Tasmania and/or Australia, 930 miles [1,500km] across the Tasman Sea); and time for genetic adaptations to develop in both original and migrant species that survived.² New Zealand is, indeed, a choice botanical "hot spot" and destination

DECEMBER 4 – Kerikeri (Bay of Islands, South Pacific [east])coast of Northland)

Before leaving the Kauri Coast, an encore visit to **Waipoua Forest** was irresistible. The trail to **Tane Mahuta** (Father of the Forest), passes many impressive kauri trees and ends at the base of the largest and most arresting – a 170'(52m) giant, 20'(6m) in diameter, with a massive, parallel-sided trunk rising unbranched up to 65'(20m) before spreading its crown. Actually, the lower branches of young trees are shed and their scars seal over as the tree grows. The kauri has a distinctive, metallic gray, resinous bark and a lineage that goes back 100 million years. Kauris of Tane Mahuta size can be 2,000 years old!

Difficult as it was to concentrate on the understory in the presence of these stately trees, the ferns at our feet were pretty amazing. Some that we had seen before were more abundant or more vigorous here, e.g. *Microsorium (Phymatosorus) pustulatum* (Polypodiaceae), its fleshy rhizomes creeping on humusy ground or epiphytic on low branches. Its fronds are multi-shaped (heteromorphic) and range from simple juveniles to large, pinnatifid, mature types with bulging, round sori visible through the upper epidermis. *M. scandens*, by comparison, has thin rhizomes, skinnier, duller fronds and is usually seen climbing a support. *Asplenium oblongifolium* is especially lush on the forest floor while *A. flaccidum* hangs from trees. Two filmy ferns vied for attention – *Trichomanes venosum* (translucent and pendulous) and toothy-edged *Hymenophyllum revolutum* (E).

All too soon it was time to leave this lush forest and head east across Northland, through Maori tribal lands into **Kerikeri** on the **Bay of Islands**. For the rest of the day we were joined by Dr. Barbara Parris, a researcher and expert on ferns of the area. Together we hiked the **Rainbow Falls Trail**). True to the name, an impressively broad waterfall greeted us near the high point of the track and the viewing area from the trail was amply "landscaped" with majestic, black ponga tree ferns. We were at eye level with their crowns and uncoiling crosiers – a "draw in your breath" moment. There were two other common tree ferns here: *Dicksonia squarrosa* (wheki) (E), with a scruffy skirt of dead fronds, and the oft-noted *Alsophila dealbata* (silver fern), easily identified by the white, farinose undersides of its foliage. We spotted *Adiantum hispidulum* (blushing pink, stiff new fronds) and *Histiopteris incisa* (a third member of the Dennstaedtiaceae) – tall, pale green and somewhat rank looking, in keeping with its family heritage. NZ climbing fern, *Lygodium articulatum* (E) grows from a ground-based rhizome and its indeterminate fronds tangle their way up any nearby support.

Asplenium oblongifolium and *A. polyodon* were compared. The former is mostly terrestrial and its simple pinnae are only slightly toothed at the margins, while the latter, usually epiphytic, has narrower fronds and smaller pinnae that are deeply, doubly toothed. *Sticherus flabellatus* (Gleicheniaceae), a beautiful “umbrella fern,” grew in open areas along the trail. *Pneumatopteris pennigera*, a fern with a woody trunk and tall, tapering, hairy fronds, is the principal NZ representative of the family Thelypteridaceae. *Deparia petersenii* (Woodsiaceae) is unmistakable with its “lady fern” look and elongated sori flaring out in pairs along the pinnule veins. *Lastreopsis glabella* and *L. hispida* (Dryopteridaceae) were both here for easy comparison of the textural differences implicit in their names. Species of *Lastreopsis* have disproportionately long basispic (downward pointing) pinnules on their lowermost pinnae. *Adiantum diaphanum* (smallest of the NZ maidenhairs) and *A. fulvum* (a hairy version of the more common *A. cunninghamii*) were noted along the trail.

Tmesipteris lanceolata was located on the trunk of *Sphaeropteris medullaris*. This smallest of the four NZ species has relatively broad leaves (for a fork fern) that are borne largely in one plane. It is a coastal or lowland forest find. Seed plants of note here included the large conifer tree *Podocarpus totara*. It has a thick, stringy, reddish-brown bark and was used for Maori canoes. There were liliaceous epiphytes like *Astelia solandri* and *Collospermum hastatum*. Shrubs of interest were the fragrant-flowered, orange-berried *Hedycarya arborea* (Monimiaceae) and the sandpapery-leaved *Rhabdothamnus solandri* (Gesneriaceae), displaying orange-red flowers that resembled miniature gloxinias. The botanical and scenic treats of the trail were augmented by the evening treat of a special barbecue dinner and tour of Dr. Parris’ personal garden, packed with ferns and overlooking a small inlet of the Bay of Islands.

DECEMBER 5 – To Thames (Coromandel Peninsula)

Most of this day was consumed by the long drive south from Kerikeri to our next overnight stop in **Thames (at the western base of the Coromandel Peninsula)**. En route, a late morning stop at **Parry Kauri Park** near the small town of Warkworth was a welcome chance to stretch legs and explore a conservation pocket park. There was an 800-year old kauri at its entrance as well as many juvenile and adolescent trees along its boardwalk trail. Also present was NZ’s only native palm– the cold-resistant Nikau *Rhopalostylis sapida*, with a bulbous, frond-generating apex and red “berries” that provide nutrition for native birds, especially the colorful NZ pigeon. Along with about 20 now familiar forest ferns, including amply fertile *Tmesipteris elongata*, we saw a 4th dennstaedtioid – *Hypolepis distans*. Its narrow fronds are only sparsely hairy, distinguishing it from its more hirsute sister species. Along the roadside we found *Macrothelypteris torresiana*, a naturalized, somewhat rank introduction. It was only the second thelypteroid fern (*Pneumatopteris pennigera* was the other) seen on the trip.

There was a pleasant afternoon stop at the **Robert Findlay Wildlife Area**, a coastal birding center since 1869, now under the protection of the Q.E. II National Trust. The trail crossed

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a small mangrove swamp adjacent to the road and opened into a cattle grazed wetland frequented by shore birds. There were good views of the Coromandel Peninsula toward which we were headed. At last we were in Thames, an unattractive town with the standard NZ shopping strip, that had clearly seen better days in the 1800's when it was a center of gold mining and kauri logging.. We did, however, find a good greengrocer and a quite acceptable Indian restaurant. Our accommodations that night were at the historic, but run down, Brian Boru Hotel, built in 1868. The writer and her husband shared the "Kauri Forest Room," named as such on the door plaque. It was painted long ago with a kauri forest scene and the walls were festooned with artificial fern fronds. A concealed UV (black) light created an eerie glow from phosphorescent paint on life-size reptiles, a lobster, and a host of other three-dimensional objects. All we could do was laugh at this bizarre scene.

DECEMBER 6 – Te Aroha

South of Thames, at the base of the Coromandel Peninsula lies **Kaimai Mamuku Forest Park**. **Te Aroha** mountain, at 3,127' (953m) is the highest point in the Kaimai range and rises steeply behind a small namesake town. From the Mokena Geyser and hot spa baths near town, we set out on the Domain Track marked "2.5 hours to summit." In botanizing time 4.5 hours would have been more realistic, though hardly leisurely – and then there was the descent! It was our most ambitious hike and one of the most rewarding. Only a few in the group made it all the way to the top, but there was a scenic lunch stop at a wooden platform overlooking the Waiketera region, said to be the best dairy-producing area in the world.

The trail was fern-rich, as the complete plant list shows, with beautiful, fertile specimens of *Blechnum filiforme* and *Blechnum fluviatile*. The latter forms exquisite flat rosettes and both are dimorphic, having skeletonized fertile fronds and broader sterile leaves. *Blechnum chambersii*, another dimorphic species, features pinnae that taper at both ends of the rachis. *B. membranaceum* (E) has short, rounded, toothed sterile pinnae that taper only at the bottom. *Blechnum* identifications were a chronic challenge, confusing even our resident expert at times. Some species, like *B. chambersii* and *B. membranaceum* are closely related, retaining reproductive compatibility and forming intermediate-looking hybrids with some frequency.

As the elevation increased, *Polystichum richardii* (E), was spotted. It is a variable species, often occurring in harsh areas, but always a dark, blue-green beauty characterized by round sori, peltate indusia with dark centers, and bristly scales. Those who climbed all the way to the top of the mountain saw *P. sylvaticum* (E). It has a more lacy pinna structure, lacks indusia and is more moisture loving. Along a drier, more open section of the trail there was an amazing colony (possibly clonal) of *Lycopodium deuterodensum* – perhaps an acre (0.4ha) or more of juvenile and adult stalks, looking like a lilliputian spruce forest. Another clubmoss, *Lycopodium volubile*, was at the end of the trail. At mid- to higher elevations three other ferns were new for the trip. *Sticherus cunninghamii*

(E) has shorter, scalier pinnae and more radial, umbrella-like fronds than sister gleichenioid *S. flabellatus*. *Rumohra adiantiformis* (Dryopteridaceae) is cultivated for the long-lasting fronds used in the fresh flower trade. *Lindsaea trichomanoides* (Lindsaeaceae) is a small, terrestrial fern, easily mistaken for a young *Asplenium*. The sori, however, curl around the outer edges of tip segments and are covered by a true indusium. At one part of the trail, near our lunch stop, *Leptolepia novae-zelandiae* (a 5th dennstaedtiod) may have been present. It is the second of three endemic GENERA in NZ (we saw the first – *Anarthropteris* –in Waipoua).

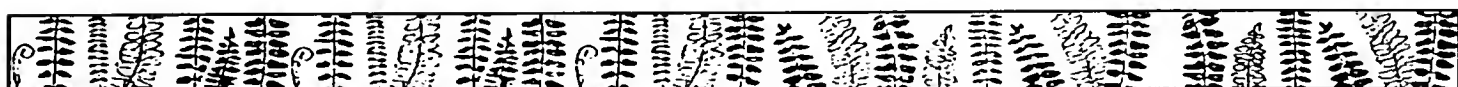
The non-pteridophyte flora at Te Aroha was also of interest. *Elatostema rugosa* (Urticaceae), a forest ground cover with large, prominently-veined, purplish-red, fuzzy leaves is found only on the North Island. Happily, it did not irritate the skin as would its sister “nettles” in North America. An epiphytic orchid, *Earina mucronata*, dangled bamboo-like leaves and apricot-lipped, dendrobium-shaped, flower clusters from a tree branch. NZ has 120 native orchids but only 7 are epiphytes. A spectacular thallose liverwort, *Monoclea forsteri*, literally covered the ground in wet areas. Our tired legs throbbed happily when planted once again at the bottom of the trail, especially those granted extra pampering with a long soak at the hot water spa right there. We departed later than expected for Rotorua.

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- ³ Dawson, John and Rob Lucas, 2000, *Nature Guide to the New Zealand Forest*, Auckland NZ, Random House New Zealand.



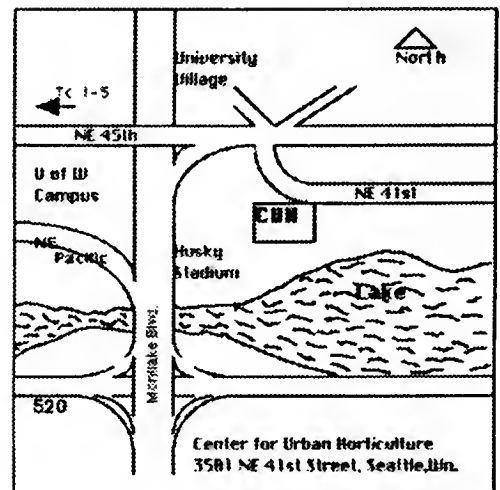
*Blechnum
novae-zelandiae*
Photo by
Milton Gottlieb



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